

Applicant(s) : Sandrine Chanut et al.
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Client Ref. No.: CT/MJS - US 10/589 138

REMARKS

Claims 1, 2, 4-8, 11-14 are canceled without prejudice and without abandonment of the subject matter thereof.

Claims 21-28 are added.

35 USC 112 Second Paragraph

The terms “very high performance” is allegedly indefinite according to the Examiner.

In order to clarify the claims, these terms have been deleted and the definition of a “very high performance concrete” according to the invention has been added in the preamble of claim 3: “A self-compacting concrete, having a characteristic 28-day compressive strength of at least 150 MPa, said compressive strength being measured for a concreted preserved and maintained at 20°C without cure or heat treatment [...]”. Necessary support for this definition can be found in the description of the invention page 1, lines 16-21.

Claim 3 is now clear.

The terms “calcined bauxite sands” are allegedly vague according to the Examiner. Since the expression “sands” refers to a mixture of different sands, the “s” at this end of “sand” is appropriate. Withdrawal of this rejection is thus respectfully requested.

The terms “preferably” and “better still” are considered indefinite by the Examiner. Accordingly, this term has been deleted from all claims where it was used. The deleted preferred embodiments have been claimed in dependent claims.

The term “small” in claim 15 is considered indefinite by the Examiner. This term has been deleted.

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The terms “white cement” in claim 16 are considered unclear by the Examiner. This term has been replaced by the terms “cement of essentially white color”, as defined in the description page 5, lines 32-37.

In claim 17, the Examiner considers the terms “it being possible” and “such as” unclear. These terms have been respectively replaced by the terms “optionally” and “including”.

The terms “chosen from” in claim 18 are considered unclear by the Examiner. These terms have thus been replaced by the terms “selected from the group consisting of”. In addition, the preferred embodiment of claim 18 has been deleted and introduced in a dependent claim 28, wherein the term “Kevlar” has been replaced by the term “PPTA (poly-paraphenylene terephthalamide)”. The specification has also been adapted.

The Examiner also considers that claim 19 is unclear due to the terms “the desired fluidity”. The claim has thus been amended to read “an effective fluidity”. In addition, the term “firstly” has been replaced by the term “first” and the parentheses have been deleted.

In claim 20, the terms “making it possible to obtain” have been replaced by “capable of”, as requested by the Examiner.

35 USC 102

The claimed invention is rejected by the Examiner under 35 USC 102(b) as allegedly being anticipated by EP 0934915, Bache (US 4,588,443), Clavaud et al. ‘234, Orange et al. ‘364 or ‘256, or Casabonne et al. (FR 2813074).

The claimed invention (see claim 3) relates to a very high-performance self-compacting concrete, having a characteristic 28-day compressive strength of at least 150 MPa, said compressive strength being measured for a concreted preserved and maintained at 20°C without cure or heat treatment, comprising:

- a cement;
- a mixture of calcined bauxite sands of various particle sizes, the finest sand having a mean particle size of less than 1 mm and the coarsest sand having a mean particle size of less than 10 mm;
- ultrafine calcium carbonate particles having a specific surface area of 10 m²/g or more, and a form factor FF of 0.3 or more;
- a defoamer;
- a water-reducing super plasticizer;
- optionally, fibers; and
- water,

the cements, sands and ultrafine calcium carbonate particles having a particle size distribution such that there are at least three and at most five different particle size classes, the ratio of the mean diameter of one particle size class to that of the class immediately above being about 10.

EP 0934915 discloses a very high-performance self-compacting concrete which does not comprise ultrafine calcium carbonate particles (but which may comprise calcium oxide or calcium sulfate).

Accordingly, the concrete of the claimed invention is new in view of EP 0934915.

Bache (US 4,588,443) discloses Densified Systems containing ultrafine Particles (DSP). Since the composition of these concretes does not comprise a defoamer, the claimed invention is new in view of this document, for at least this reason.

In addition, whereas the concrete according to the invention has a characteristic 28-day compressive strength of at least 150 MPa without heat treatment (“*for a concreted*

preserved and maintained at 20°C without cure or heat treatment”), the DSPs disclosed in the Bache reference require a heat treatment to reach an effective compressive strength (e.g. 5 days at 60°C, see col. 79, lines 3-5).

Accordingly, the concrete of the claimed invention is new in view of Bache.

Clavaud (‘234) discloses very high performance concretes optionally comprising limestone (claim 4). These concretes all require a heat treatment to reach a compressive strength of at least 150 MPa (see table A, last line, and col.4, lines 17-26).

Accordingly, the concrete of the claimed invention is new in view of Clavaud (‘234).

Orange (‘364 or ‘256) discloses the use of particular organic fibers in an ultrahigh performance concrete in order to improve the fire resistance of the concrete.

First, the concretes disclosed in Orange do not comprise a mixture of calcined bauxite sands of various particle sizes.

Second, even if the concretes disclosed in Orange may comprise calcium carbonate fibers as reinforcing agent, these concretes do not comprise ultrafine calcium carbonate particles having a specific surface area of 10 m²/g or more, and a form factor FF of 0.3 or more.

Accordingly, the concrete of the claimed invention is new in view of Orange (‘364 or ‘256).

Casabonne (FR 2813074) discloses classical concretes (28-day compressive strength < 150MPa, see table 2, page 11 of the specification) which do not comprise calcined bauxite sands.

Accordingly, the concrete of the claimed invention is new in view of Casabonne (FR 2813074).

The claimed invention is rejected by the Examiner under 35 USC 103(a) as allegedly being obvious over EP 0934915, Bache (US 4,588,443), Clavaud et al. '234, Orange et al. '364 or '256, or Casabonne et al. (FR 2813074).

The claimed invention differs from EP 0934915 by the total replacement of silica fume by ultrafine calcium carbonate particles having a specific surface area of 10 m²/g or more, and a form factor FF of 0.3 or more.

The aim of the claimed invention was to obtain a light-colored and very high-performance self-compacting concrete, having a characteristic 28-day compressive strength of at least 150 MPa, said compressive strength being measured for a concreted preserved and maintained at 20°C without cure or heat treatment, which is a strong advantage.

The concretes disclosed EP 0934915 have excellent mechanical properties (characteristic 28-day compressive strength of at least 150 MPa) without necessitating any heat treatment. One of the essential components of these concretes which participate to their excellent compressive strength is silica fume, which is a pozzolanic element (i.e. an element having cementitious properties).

However, silica fume has a gray tint and thus cannot be used for preparing light-colored concretes.

The inventors thus needed to find a component capable of replacing totally silica fume without losing the excellent mechanical properties of the concrete.

Bache (US 4,588,443) discloses Densified Systems containing ultrafine Particles (DSP) requiring a heat treatment to reach a 28-day compressive strength of at least 150 MPa.

Consequently, the person having ordinary skill in the art would not have any apparent reason to combine the teaching of this document with the teaching of EP 0934915 to find an alternative to silica fume without losing the excellent mechanical properties of the concrete.

Moreover, even if the person having ordinary skill in the art would have considered the Bache reference, it would not have been incited to replace totally silica fume with ultrafine calcium carbonate particles.

Indeed, Bache only mentions that, according to an embodiment, “*ultra fines particles A are used as a calcium source which is a far less reactive form than cement, e.g. by using colloidal calcium carbonate*” (see col.40, l. 57-59, emphasis added). A little further on, Baches recites “*an embodiment of the invention comprises incorporating calcium carbonate particles [...] among the particles A*” (see col. 41, l.18-21, emphasis added). Accordingly, the person having ordinary skill in the art, is thus informed that :

- (1) colloidal (i.e. a solution of) calcium carbonate can be added in the composition,
- (2) said solution of calcium carbonate is far less reactive compared to the cement, i.e. that colloidal calcium carbonate is not a pozzolanic element (has no cementitious properties),
- (3) said solution of calcium carbonate should be added in addition to the ultrafine particles A.

The skilled person, in view of the Bache reference, would therefore not have been incited to replace totally silica fume by ultrafine calcium carbonate particles, as in the claimed invention.

The claimed invention is thus non-obvious in view of the Bache reference, taken alone or in combination with EP 0934915.

Clavaud (‘234) discloses very high performance concretes optionally comprising limestone (claim 4). These concretes all require a heat treatment to reach a compressive strength of at least 150 MPa (see table A, last line, and col.4, lines 17-26).

Since the concretes disclosed in Clavaud all require a heat treatment, the skilled person would have no apparent reason to combine this document with EP 0934915. Moreover, even if he would have looked to this document and combine its teaching with EP 0934915, since Clavaud ('234):

- only mentions that limestone can be optionally added to the concrete, and
- that the use of the very specific ultrafine calcium carbonate particles having a specific surface area of 10 m²/g or more and a form factor FF of 0.3 as in the claimed invention is never suggested,

he would never have been incited to replace totally silica fume by said very specific ultrafine calcium carbonate particles in order to obtain a light colored and very-high performance concrete as claimed in the present invention

The claimed invention is thus non-obvious in view of Clavaud taken alone or in combination with EP 0934915.

Orange ('364 or '256) discloses concretes comprising calcium carbonate **fibers** as reinforcing agent in order to improve their fire resistance. Moreover, Orange never mentions that these calcium carbonate fibers can replace silica fume. Accordingly, the skilled person, having knowledge of the teaching of Orange, even in view of EP 0934915, would thus never have been incited to replace totally silica fume by ultrafine calcium carbonate particles in order to obtain a light colored and very-high performance concrete as claimed in the present invention.

The claimed invention is thus non-obvious in view of Orange taken alone or in combination with EP 0934915.

Casabonne (FR 2813074) discloses classical concretes (28-day compressive strength < 150MPa) which do not comprise calcined bauxite sands. The skilled person would thus have no apparent reason to combine it with the teaching of EP 0934915. Moreover, even if the skilled person would have combined these two documents, since Casabonne :

- only mentions the use of limestone as non pozzolanic reaction element (cement additive), and
- never mentions the use of ultrafine calcium carbonate particles having a specific surface area of 10 m²/g or more, and a form factor FF of 0.3,

the skilled person, would thus never have been incited to replace totally silica fume by said ultrafine calcium carbonate particles in order to obtain a light colored and very-high performance concrete as claimed in the present invention.

The claimed invention is thus non-obvious in view of Casabonne taken alone or in combination with EP 0934915.

From the foregoing remarks, it clearly appears that the claimed invention is non obvious over the cited prior art. Thus, the Examiner's rejection under 35 U.S.C. §103 on the basis of the cited references is respectfully traversed and should be withdrawn.

Conclusion

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

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Respectfully submitted,

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